Objection to the Specification:

The Specification was objected to for an informality. The Office Action states that reference numeral "44" should be changed to reference numeral "42" on page 16, line 29 of the Specification. The Specification has been amended in a manner that addresses the concerns expressed in the Office Action. Accordingly, removal of the objection to the Specification is respectfully requested.

Objection to the Claims:

Claims 12-13 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant sincerely appreciates the Examiner's recognition of the patentable subject matter recited in claims 12-13 and awaits allowance of the remaining claims in the case. Applicant asserts that it is the combinations of features in these claims that render the claim distinguishable over the cited art, not just the portions of the claims cited in the Office Action.

Section 102 Rejection:

Claim 11 was rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,970,069 to Kumar et al. (hereinafter "Kumar"). The standard for "anticipation" is one of fairly strict identity. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP 2131. Kumar does not disclose all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

Kumar does not teach or suggest a method for transmitting and receiving a serial data stream including alternating portions of multiple serial data channels, where the method includes providing a plurality of functional units each configured to perform a specific

function of a serial communication protocol upon the portions of the multiple serial data channels. Amended claim 11 states in part:

> A method for transmitting and receiving a serial data stream including alternating portions of multiple serial data channels, comprising: providing a plurality of functional units each configured to perform a specific function of a serial communication protocol upon the portions of the multiple serial data channels …

Support for the limitation may be found, for example, in the Specification, page 12, lines 12-18:

> Serial communication controller 16 includes a set of functional units which effect transmission and reception of a serial data stream according to the HDLC protocol. The set of functional units includes a cyclic redundancy check (CRC) calculation unit 30, a zero bit insertion unit 32, a flag detection unit 34, a serial interface unit 36, and a time slot assigner group 38 coupled to a main bus 40. The functional units are operably coupled in series such that the functional units operate upon the serial data stream in sequence.

In this manner, each of the serially connected functional units operates (i.e., provides a specific function of a serial communication protocol) in sequence upon a single time division multiplexed (TDM) serial data stream (i.e., a serial data stream including alternating portions of multiple serial data channels).

Kumar does not teach or suggest a method for transmitting and receiving a serial data stream including alternating portions of multiple serial data channels, where the method includes providing a plurality of functional units each configured to perform a specific function of a serial communication protocol upon the portions of the multiple serial data channels. Statements in the Office Action suggest that Kumar discloses a method, which includes "providing a plurality of functional units (SWAN 76, E110 controller 74, V.34 IF 72) each configured to perform a specific function of a serial communication protocol." (Office Action -- pg. 2.) However, Kumar does not teach or suggest that SWAN 76, E110 controller 74, and V.34 IF 72 are configured to perform a specific function of <u>a serial communication protocol</u> upon <u>a serial data stream</u> (i.e., a single TDM serial data stream). Instead, Kumar teaches that SWAN 76, E110 controller 74, and V.34 IF 72 are *interface controllers*, each of which provide a connection to an external interface within a communications network. For example, Kumar teaches that the

"communication interfaces include LAN interface 36, PCI interface 38 and SWAN interfaces 40, 42a, 42b and 44." (Kumar -- col. 5, lines 24-26.)

In addition, Kumar specifically teaches:

V.34 interface controller 72 ... provides a serial digital interface to an external
V.34 CODEC and digital-to-analog converter ... Ethernet controller 74 ...
provides a connection to an external Media Independent Interface (MII) ... [and]
Multiple-protocol SWAN controllers 76a, 76b, 76c, and 76d support four multi-
protocol WAN interfaces. (Kumar -- col. 5, lines 38-48.)

In this manner, each of the interface controllers 72, 74, and 76 is coupled to a _different_ data channel (i.e., network interface) to transfer _different_ serial data streams to/from DMA controller 82. In addition, each of the interface controllers 72, 74, and 76 receive and transmit the different serial data streams according to a _different_ communication protocol. For example, E110 controller 74 is coupled to "LAN interface 36 [which] can be configured to support a variety of protocols, such as IP and IPX over Ethernet." (Kumar -- col. 4, lines 45-46.) Alternatively, "SWAN controller 76a can support a Frame Relay protocol over a leased line that is coupled to Multi-protocol WAN interface 40." (Kumar -- col. 5, lines 52-54.) Therefore, each of the interface controllers 72, 74, and 76 are not configured to perform a specific function of _a serial communication protocol_ upon _a serial data stream_, as described above and in independent claim 11. Accordingly, Kumar does not teach or suggest all limitations of claim 11.

Kumar does not teach or suggest a method for transmitting and receiving a serial data stream including alternating portions of multiple serial data channels, where the method includes providing a plurality of functional units, each of which operates alternately upon the portions of the multiple serial data channels. Amended claim 11 states in part:

A method for transmitting and receiving a serial data stream including
alternating portions of multiple serial data channels, comprising: providing a
plurality of functional units ... such that the plurality of functional units operates
alternately upon the portions of the multiple serial data channels.

As noted above, the Specification clearly teaches that "[t]he functional units are operably coupled in series such that the functional units operate upon the serial data stream in sequence." (Specification -- pg. 12, lines 16-18.) In other words, each of the serially connected functional units operates in sequence (i.e., alternately) upon a serial data stream (i.e., a single time division multiplexed serial data stream comprised of alternating portions of the multiple serial data channels). In addition, the Specification clearly describes "operat[ing] alternately upon the portions of the multiple serial data channels" as passing "the serial data stream from one functional unit to the next in serial form during processing." (Specification -- pg. 13, lines 1-2.)

Kumar, on the other hand, does not teach or suggest a method for transmitting and receiving a serial data stream including alternating portions of multiple serial data channels, where the method includes providing a plurality of functional units, each of which operates alternately upon the portions of the multiple serial data channels. As such, statements in the Office Action suggesting that Kumar discloses a method in which "the plurality of functional units operates alternately upon the portions of the multiple serial data channels (the connections between the controllers 72, 74, 76 and MultiChannel DMA controller 82)," is respectfully traversed.

In particular, Kumar does not teach or suggest that interface controllers 72, 74, and 76 are coupled to DMA controller 82 in such a manner that interface controllers 72, 74, and 76 can operate alternately upon the portions of the multiple serial data channels (i.e., can operate upon a single serial data stream). Instead, Kumar specifically teaches "DMA controller 82 has six channels which are coupled to respective controllers 72, 74, and 76a-76d for directing data from any one of the controllers to memory 84 or to transfer bus 86." (Kumar -- col. 6, lines 4-7.) As such, Kumar teaches that interface controllers 72, 74, and 76 are coupled to DMA controller 82 to operate upon different serial data streams, such that each of the six channels within DMA controller 82 directs data from one of the controllers to memory 84 or to transfer bus 86. In addition, Fig. 3 of Kumar distinctly illustrates interface controllers 72, 74, and 76 as being coupled to DMA controller 82 in parallel. In this manner, Kumar does not teach that interface controllers 72, 74, and 76 are coupled in such a manner that allows interface controllers 72, 74,

and 76 to operate alternately upon <u>a serial data stream</u>, such that the serial data stream is passed "from one functional unit to the next in serial form during processing," as described above. Accordingly, Kumar does not teach or suggest all limitations of claim 11.

For at least the reasons set forth above, Kumar does not teach or suggest all of the limitations of claim 11. Therefore, claim 11 is asserted to be patentably distinct over the cited art. Accordingly, removal of the § 102(e) rejection of claim 11 is respectfully requested.

<u>Section 103 Rejections:</u>

Claims 1-10 and 14-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kumar in view of U.S. Patent No. 5,991,817 to Rowett et al. (hereinafter "Rowett"). To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974); MPEP 2143.03. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed.Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); and, MPEP 2143.01. The cited art does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

None of the cited art teaches or suggests a serial communication controller including a plurality of functional units operably coupled in series. Claim 1 states in part: "[a] serial communication controller for transmitting and receiving a serial data stream including multiple serial data channels having portions which alternate in time with respect to each other, comprising: a plurality of functional units operably coupled in series ... ." Claim 14 recites a similar limitation. Statements in the Office Action suggest that Kumar "discloses a serial communication controller (MultiChannel DMA controller 82 in fig. 3) for transmitting and receiving a serial data stream including multiple serial data channels having portions which alternate in time with respect to each other ... comprising: a plurality of functional units (controllers 72, 74, 76 in figure 3) operably coupled in series" (Office Action -- pp. 3-4). As will be described in more detail below, such a statement is hereby respectfully traversed.

Kumar does not teach or suggest a serial communication controller including a plurality of functional units operably coupled in series. In Fig. 3, for example, Kumar distinctly illustrates interface controllers 72, 74, and 76 as being <u>coupled in parallel</u> to DMA controller 82. In support of such a parallel connection, Kumar specifically teaches "DMA controller 82 has <u>six channels which are coupled to respective controllers 72, 74, and 76a-76d</u> for directing data from any one of the controllers to memory 84 or to transfer bus 86." (Kumar -- col. 6, lines 4-7, emphasis added.) In this manner, Kumar does not teach or suggest that interface controllers 72, 74, and 76 are <u>operably coupled in series</u>, as described in present claims 1 and 14.

In addition, Kumar provides no motivation to teach or suggest interface controllers 72, 74, and 76 as being operably coupled in series. For example, Kumar specifically teaches that the "remote access processor... supports diverse remote access technologies." (Kumar -- col. 34, lines 57-60.) In particular, Kumar teaches that such diverse remote access technologies include "local area (LAN) network interface 36 ... and a plurality of serial wide area network (SWAN) interfaces 40, 42, and 44." (Kumar -- col. 4, lines 36-40.) To control data transfer over such diverse remote access technologies, Kumar teaches "V.34 CODEC interface 44 is coupled to V.34 interface controller 72 ... Ethernet controller 74 is coupled to Ethernet [LAN] interface 36 ... [and] SWAN controllers 76a, 76b, 76c, and 76d ... [are coupled to] WAN interfaces," such as WAN interfaces 40 and 42. (Kumar -- col. 5, lines 38-48.) In this manner, interface controllers 72, 74, and 76 are <u>operably coupled in parallel</u> to DMA controller 82 to be able to support such diverse remote access technologies. Thus, Kumar provides no motivation to teach or suggest a plurality of functional units operably coupled in series, since doing so would not allow the remote access processor of Kumar to support such diverse remote access technologies. Accordingly, Kumar does not teach or suggest all limitations of present claims 1 and 14.

Furthermore, Rowett does not teach or suggest a serial communication controller including a plurality of functional units operably coupled in series. For example, statements in the Office Action suggest "Rowett (5,991,817) discloses a time slot assigner TSA 46 (fig.1) which is coupled to multiple serial communication controllers SCC 45." (Office Action -- pg. 4). In addition, further statements in the Office Action associate the multiple serial communication controllers SCC 45 to a plurality of functional units. (Office Action -- pg. 4.) However, Fig. 11a

of Rowett distinctly illustrates the plurality of SCCs 45 as being operably <u>coupled in parallel</u> to DMA controller 42 through respective serial channels 44. As such, Rowett does not teach or suggest that serial communication controllers 45 are <u>operably coupled in series</u>. Accordingly, Rowett does not teach or suggest all limitations of present claims 1 and 14.

Moreover, Rowett cannot be combined with Kumar to overcome the deficiencies therein. As stated above, none of the cited art teaches or suggests a serial communication controller including a plurality of functional units operably coupled in series, as described in present claims 1 and 14. Therefore, the cited art cannot be combined to teach or suggest such a limitation.

None of the cited art teaches or suggests a serial communication controller including a plurality of functional units that operates alternately upon the portions of the multiple serial data channels. Claim 14 states in part:

> ... a serial communication controller coupled to receive ... the receive serial data stream, wherein the serial communication controller comprises a plurality of functional units ... and wherein the plurality of functional units operates alternately upon the portions of the multiple serial data channels of the receive serial data stream.

Claims 1 and 6 recite similar limitations. Though not specifically cited in the Office Action, claim 11 also recites a similar limitation. Support for the limitation may be found, for example, in the Specification, page 13, lines 1-2: "dedicated signal lines of main bus 40 may be used to pass the serial data stream from one functional unit to the next in serial form during processing."

As stated above, Kumar does not teach or suggest a serial communication controller including plurality of functional units that operates alternately (i.e., in time sequence) upon the portions of the multiple serial data channels. In fact, the Office Action states: "Kumar is different from the [present] claim that the plurality of functional units in Kumar does not operate in time sequence upon the portions of the multiple serial data channels." (Office Action -- pg. 4). Accordingly, Kumar does not teach or suggest all limitations of present claims 1, 6, 11 and 14.

In addition, Rowett does not teach or suggest a serial communication controller including plurality of functional units that operates alternately upon the portions of the multiple serial data channels. Instead, Rowett specifically teaches:

> TDM data stream 99 includes two B channel time slots and one D channel time slot … [t]he data packets carried in the first B-channel are received and transmitted through the time slot assigner 46, SCC 45 and the FIFO for serial channel 5, the data packets carried in the second B-channel are received and transmitted on serial channel 4 and the data packets carried on the D-channel are received and transmitted from serial channel 3. (Rowett -- col. 9, lines 22-31, emphasis added.)

As such, Rowett teaches that TSA 46 is coupled in parallel to a plurality of serial communication controllers (i.e., SCCs 45), such that each portion (i.e., first B-channel portion, second B-channel portion, and the D-channel portion) of a single TDM data stream 99 is directed through a different one of the plurality of SCCs 45 to DMA controller 42, as shown in Fig. 11a. Therefore, Rowett does not teach or suggest that TDM data stream 99 is passed from one functional unit to the next in serial form during processing. Therefore, Rowett does not teach or suggest a serial communication controller including plurality of functional units that operates alternately upon the portions of the multiple serial data channels. Accordingly, Rowett does not teach or suggest all limitations of claims 1, 6, 11, and 14.

Moreover, Rowett cannot be combined with Kumar to overcome the deficiencies therein. In particular, Rowett cannot be combined with Kumar in such a manner that teaches or suggests a plurality of functional units that operates alterately upon the portions of the multiple serial data channels. In regards to such a limitation, however, statements in the Office Action suggest "it would have been obvious to a skilled artisan to couple the TSA 46 as taught by Rowett to the controllers (72, 74, 76) in Kumar's system." (Office Action -- pg. 4.) As will be described in more detail below, such statements are hereby respectfully traversed.

In general, the remote access processor of Kumar cannot be modified to include the time slot assigner (i.e., TSA 46) of Rowett, such that the combination of cited art teaches or suggests that the "plurality of functional units operates in time sequence upon the portions of the multiple serial data channels", as taught in claims 1, 6, 11 and 14. As stated above, Rowett

teaches that TSA 46 is coupled in parallel to a plurality of serial communication controllers (i.e., SCCs 45), such that each portion of TDM data stream 99 is directed through a different one of the plurality of SCCs 45 to DMA controller 42. Therefore, modifying the remote access processor of Kumar to include the time slot assigner (i.e., TSA 46) of Rowett would involve coupling TSA 46 in parallel to the plurality of interface controllers 72, 74, and 76 within the remote access processor of Kumar. As such, each portion of a single TDM data stream would be directed to a different one of the plurality of interface controllers 72, 74, and 76. As stated above, however, each of the plurality of interface controllers 72, 74, and 76 provides a connection to a _different_ network interface to receive and transmit a _different_ data stream according to a _different_ communication protocol. As such, directing portions of a single TDM data stream (having a particular communication protocol) to a plurality of interface controllers (72, 74, 76), each of which operate according to a different communication protocol, would render the remote access processor of Kumar inoperable. If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); MPEP 2143.01. Therefore, Rowett cannot be combined with Kumar to teach or suggest all limitations of claims 1, 6, 11 and 14.
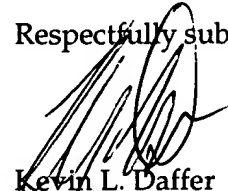
For at least the reasons set forth above, none of the cited art teaches or suggests all of the limitations of claims 1, 6, 11, and 14. Therefore, claims 1, 6, 11, and 14, as well as claims dependent therefrom, are asserted to be patentably distinct over the cited art. Accordingly, removal of the § 103(a) rejections of claim 1-10 and 14-16 is respectfully requested.

CONCLUSION

In this response, the Specification and claim 11 have been amended. Rejections and/or objections of pending claims have been addressed. Therefore, response constitutes a complete response to all issues raised in the Office Action mailed May 8, 2002. In view of the remarks traversing the rejections, Applicants assert that pending claims 1-16 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned attorney earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment, to Conley, Rose & Tayon, P.C. Deposit Account No. 50-1505/5000-74400.

Respectfully submitted,

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ATTACHMENT A
"Marked-Up" Amendments

IN THE SPECIFICATION

Please amend pg. 16, line 29 - pg. 17, line 3, as follows:

In the transmit mode, microcontroller [44] 42 reads data to be transmitted from dual-port memory unit 44 and provides the data in parallel form to CRC calculation unit 30. A serial data stream is thus transferred to CRC calculation unit 30 in parallel data units (e.g., bytes or words). In the receive mode, CRC calculation unit 30 is coupled to receive the serial data stream produced by zero bit insertion unit 32.

IN THE CLAIMS

Please amend claim 11 as follows:

11. (Amended) A method for transmitting and receiving a serial data stream including alternating portions of multiple serial data channels, comprising:

      providing a plurality of functional units each configured to perform a specific function of a serial communication protocol upon the portions of the multiple serial data channels, wherein each functional unit is a state machine having a set of unique operating states, and wherein state information stored within a given functional unit determines the one of the unique operating states in which the functional unit is operating; and

      transferring state information between the plurality of functional units and a memory unit such that the plurality of functional units operates alternately upon the portions of the multiple serial data channels.